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(56) Documents Cited
GB 2357044 A   GB 2271912 A
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(54) Abstract Title
Automatic configuration of a computer system based on its physical location

(57) A system (and software facility, method and programmable storage device) for automatically configuring a portable device, includes an electronic unit for electronically determining a physical location of the portable device, a module for retrieving the location configuration information corresponding to the physical location determined, and a module for configuring the portable device based on the information contained in the location configuration.
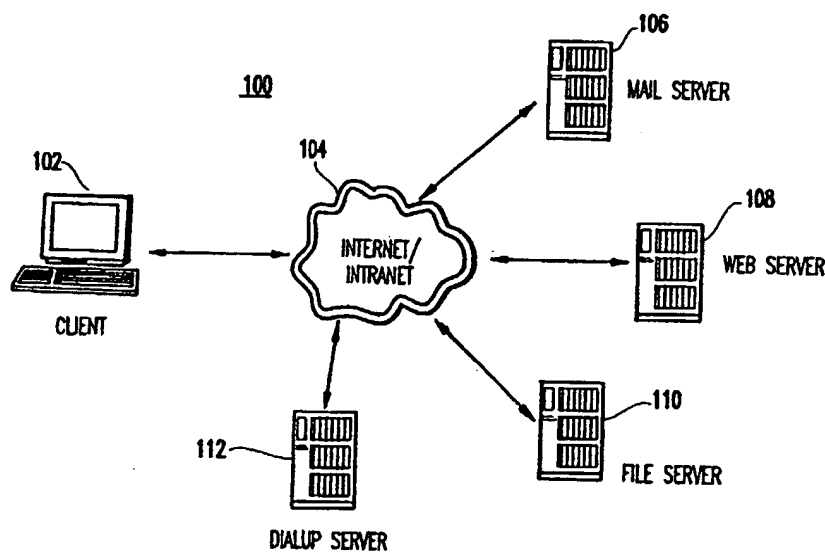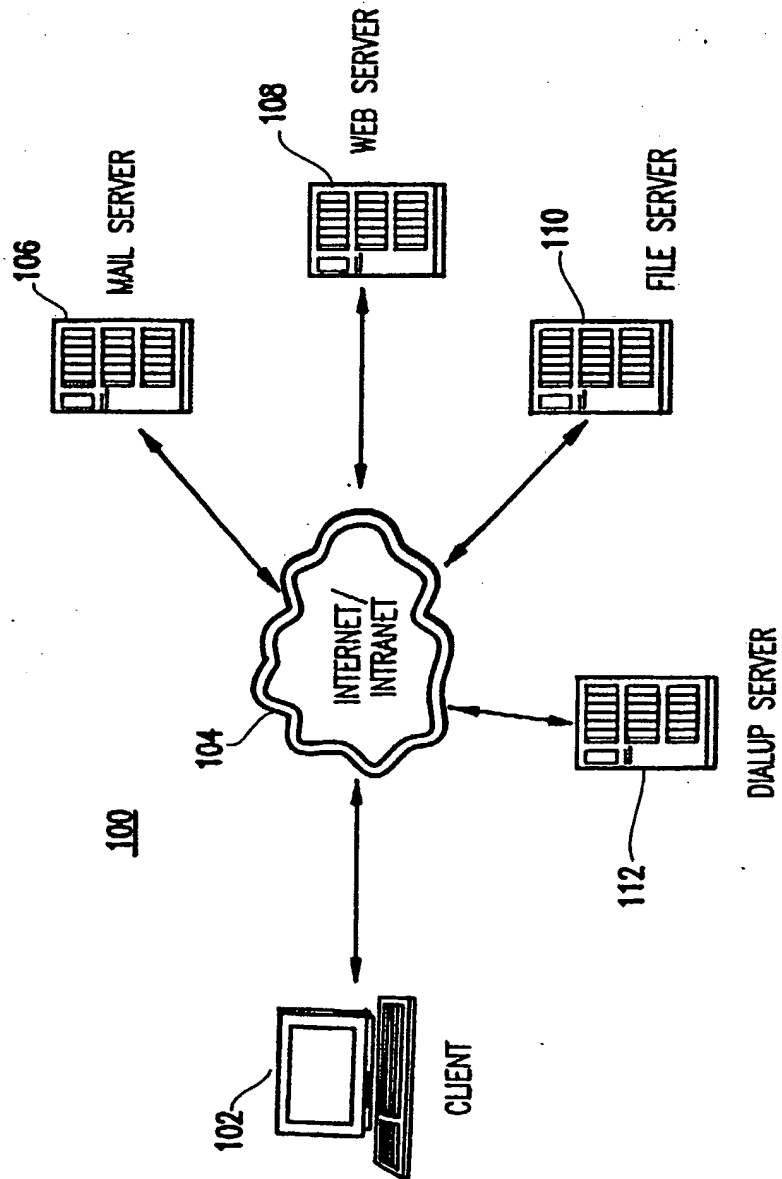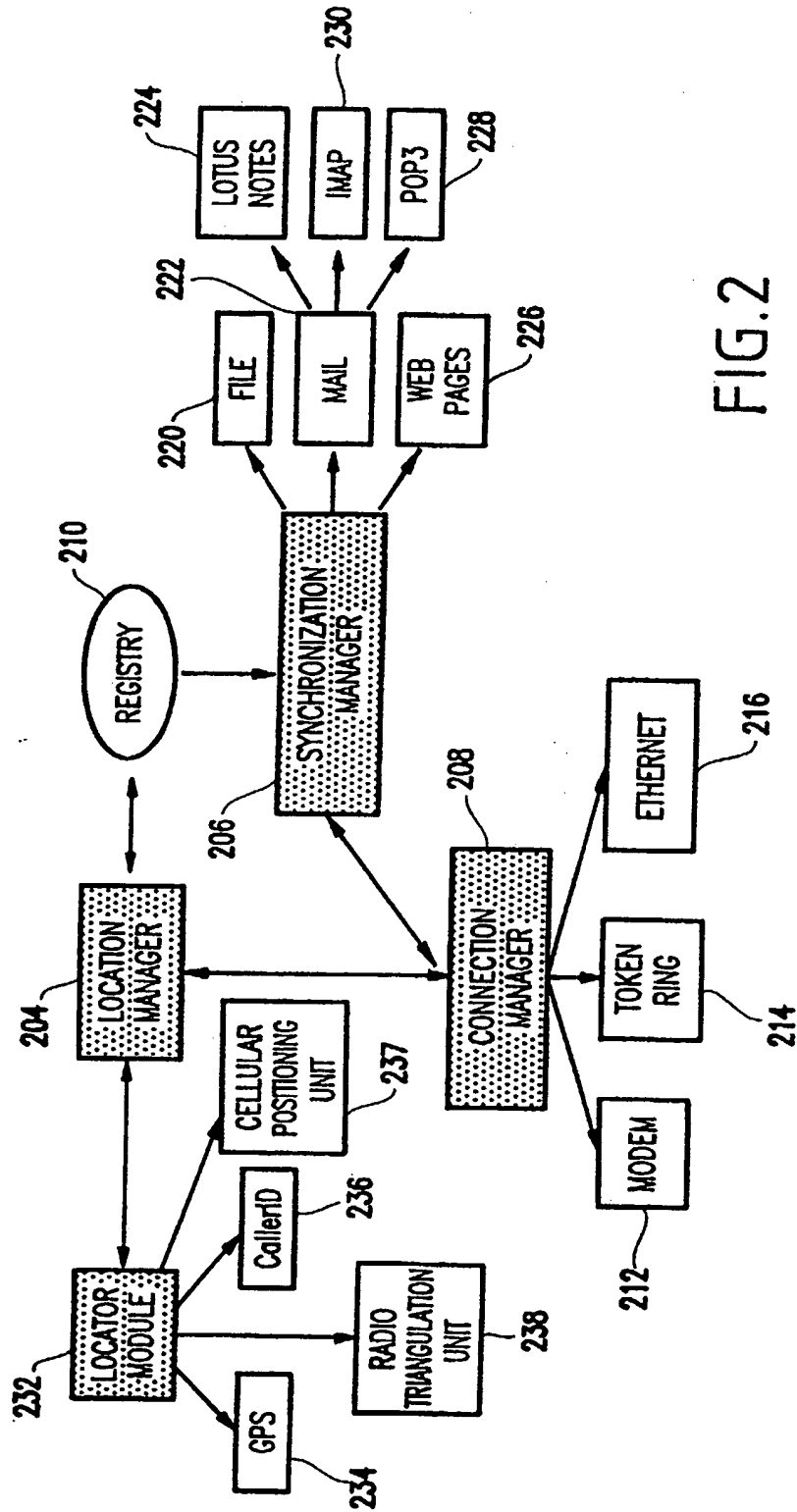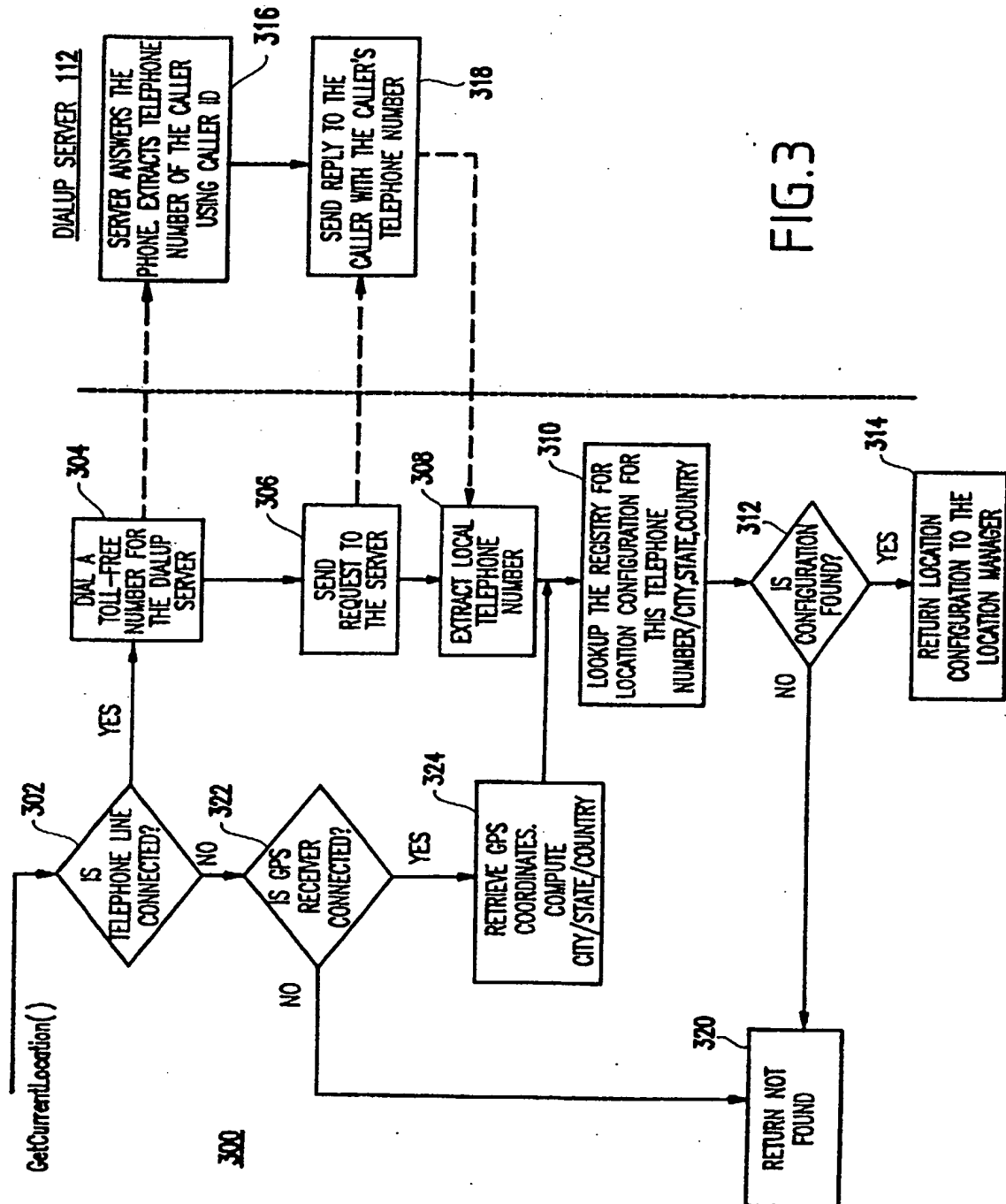
FIG.1

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FIG.1

FIG.2

DIALUP SERVER 112

SERVER ANSWERS THE PHONE. EXTRACTS TELEPHONE NUMBER OF THE CALLER USING CALLER ID — 316

SEND REPLY TO THE CALLER WITH THE CALLER'S TELEPHONE NUMBER — 318

GetCurrentLocation()

300

IS TELEPHONE LINE CONNECTED? — 302

YES →

NO → IS GPS RECEIVER CONNECTED? — 322

YES → RETRIEVE GPS COORDINATES. COMPUTE CITY/STATE/COUNTRY — 324

NO →

DIAL A TOLL-FREE NUMBER FOR THE DIALUP SERVER — 304

SEND REQUEST TO THE SERVER — 306

EXTRACT LOCAL TELEPHONE NUMBER — 308

LOOKUP THE REGISTRY FOR LOCATION CONFIGURATION FOR THIS TELEPHONE NUMBER/CITY/STATE/COUNTRY — 310

IS CONFIGURATION FOUND? — 312

YES → RETURN LOCATION CONFIGURATION TO THE LOCATION MANAGER — 314

NO →
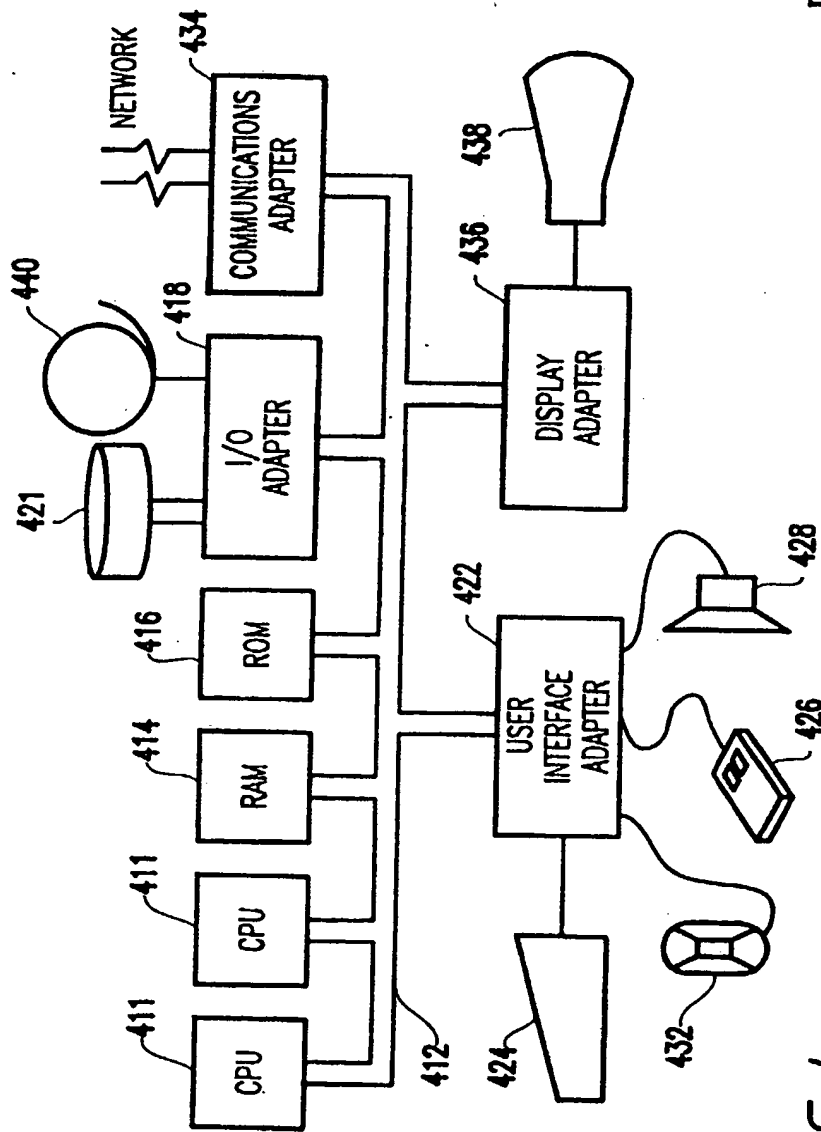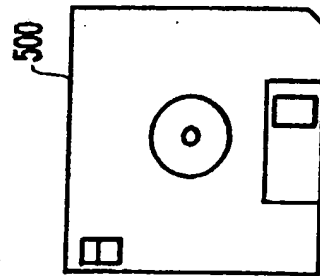
RETURN NOT FOUND — 320

FIG.3

FIG.4

FIG.5

AUTOMATIC CONFIGURATION OF A COMPUTER SYSTEM
BASED ON ITS PHYSICAL LOCATION

5   The present invention relates to the provision of automatic
configuration of a portable device such as a computer system, based on its
physical location, using electronic means.

BACKGROUND OF THE INVENTION

10

Due to availability of cheaper, smaller and more powerful computers
(e.g., laptops and the like), and easy accessibility to networking
infrastructure such as a local area network (LAN) and a telephone
connection, an increased number of people are travelling with their
15   computers. The set of options for connecting to the network and the set of
resources that are available to a user are largely determined by the
physical location where the user is currently located.

For example, if a user is in an office in New York, then the user
20   would connect to the office network using a local area network and would
have access to all the services such as scanners and printers located at
the office in New York. If for some reason, the users travels with his
computer to his branch office in Florida, then the user would have access
to resources available at the branch office in Florida. During the trip,
25   if a user stays at a hotel somewhere or travels through an airport, then
the user would have access to resources available at the hotel or the
airport, respectively.

Typically, at a hotel, the user would use the telephone lines to dial
30   into the office network, and use the printers available at the hotel. After
establishing a network connection, a typical user would use a variety of
software applications to access and manage the information that the user is
interested in. For example, to send and receive mail, the user would employ
an e-mail client such as Lotus Notes® or Microsoft Outlook®. To transfer
35   files between the user's computer and the office server, the user would
either manually copy files or use a file transfer application.

However, a major problem with the current computer system
configuration is that the user has to frequently update the computer system
40   configuration parameters whenever the user connects from a different
physical location (e.g., hotel, airport, etc.). Such computer system

configuration parameters include telephone numbers for connecting to the local service provider, network parameters such as domain name servers, Internet Protocol (IP) address, and printer settings.

5   This chore is further complicated in that this information must be updated using several software applications, and any inconsistency in updating any of the configuration information can render the computer useless for that physical location. This is a problem.

10   The problem is further exacerbated for a certain class of workers such as sales personnel, insurance agents, etc. who frequently travel. During a typical work-week, a sales representative may visit several sites. At each location, a worker must reconfigure the computer configuration settings. This is highly inconvenient for them.

15

      It is noted that some commercial products (e.g., Symantec's Mobile Essentials®) attempt to provide some centralized management and deployment of location profiles. The location profiles include general location information (e.g., country, city and time zone), dialling, network settings

20   for transmission control protocol (TCP)/Internet Protocol (IP) and dial-up, printer configuration and profile setting for other applications such as Web Browsers and E-mail clients. Another commercial product (e.g., 3Com's DynamicAccess Mobile Connection Manager®) supports creation of multiple standard LAN and remote access configurations. It features single

25   click switching between locations and supports read-only locations for troubleshooting and ease of maintenance.

      However, similarly to Symantec's product, this product is deficient in automatically configuring a computer system based on its physical

30   location and certainly does not provide such configuration using an electronic means. Indeed, the computer configuration is performed based on the location selected by a user.

      Thus, while it may be possible for travellers, etc. to connect to

35   their "home" network (e.g., an Intranet or the like) etc., there is a lot of work, trouble and inconvenience for the users in establishing a network connection. That is, much configuration of the computer must be changed in establishing such a successful network connection and gaining access to the user's data, e-mail, other network resources, etc.

DISCLOSURE OF THE INVENTION

Generally, the present invention provides a method and system for providing automatic configuration of a portable device (e.g., a computer) based on its physical location.

In a first aspect of the present invention, a system for automatically configuring a portable device includes an electronic device for electronically inferring the physical location of the portable device, a module for retrieving the location configuration information corresponding to the physical location determined, and a module for configuring the portable device based on the information contained in the location configuration.

In a second aspect, a method for automatically configuring a user's portable device includes electronically inferring the physical location of the portable device, retrieving the location configuration information corresponding to the physical location determined, and configuring the portable device based on the information contained in the location configuration.

Thus, the present invention automatically configures the portable device (e.g., a laptop computer in an exemplary embodiment) based on determination of its physical location using electronic means. The configuration is done based on intuitive physical location-based abstraction for administering and performing connectivity and information management tasks.

The inference of physical location is preferably based on inputs from an electronic unit/means such as a caller identification (ID) and/or a Global Positioning System (GPS) (or others such as cellular positioning systems, radio triangulation, other satellite positioning methods, etc.)

Preferably, a software module called a "Locator Module" provides gathered information on the physical location of the computer to a Location Manager, which uses the information to select a pre-configured location to configure the computer system.

Although position location is preferably determined by detection of signals from the user device, it may, instead, be inferred from a predetermined stored travel schedule.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described with reference to a preferred embodiment as illustrated in the attached drawings, in which:

FIG. 1 illustrates a preferred system configuration according to the present invention;

FIG. 2 illustrates a logical software block diagram according to the present invention;

FIG. 3 illustrates a flow control diagram for a Locator Module 232 GetCurrentLoction() Application Programming Interface (API);

FIG. 4 illustrates an exemplary information handling/computer system 400 for use with the invention on the client (user) side; and

FIG. 5 illustrates a medium 500 for storing a program for implementing the method according to the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Figure 1 illustrates a preferred system 100 configuration for the invention. Preferably, the present invention is installed on a portable device such as a client computer 102. The client computer can be advantageously embodied by a laptop personal computer (PC), but of course other portable devices would also find great benefit with the invention, as would be known by one of ordinary skill in the art taking the present application as a whole. Figure 4 described below illustrates an exemplary form which the client computer may take.

The client 102 computer has an operating system such as Windows 95®, Windows 98®, Windows NT®, or Linux® and appropriate hardware adapters such as a modem, cable modem, DSL modem, token-ring, or Ethernet, to connect to the Internet/Intranet 104.

The client 102 also includes appropriate software drivers installed to enable it to use the TCP/IP communication protocol over the hardware adapters. In addition, the client computer 102 has all the necessary software applications that a user uses to manage its routine information management tasks. These applications include a web browser, a dialler and

mail clients. The web browser can be embodied by Netscape Navigator® or Microsoft's Internet Explorer®, a dialer can be embodied by AT&T's Global network dialer; and mail clients can be embodied by Lotus Notes®, Microsoft Outlook®, or Eudora® .

A user uses the client computer 102 to perform information management tasks with the server connected to the Internet/Intranet 104. These tasks include sending and receiving electronic mail from a mail server 106, retrieving web pages from a web server 108, and sending and receiving data files from a file server. These servers can be embodied, for example, as an IBM RISC® System 6000 computer running the AIX™ operating system, or a PC running Microsoft's Windows NT® Server operating system.

The system 100 configuration also includes a dial-up server 112. The dial-up server 112 provides a service that determines a telephone number of a location from where the caller is calling from. To make this determination, the dial-up server uses a telephone Caller-identification (ID) service. The dialup server sends the caller ID back to the invention which is captured in software. This feature requires no additional hardware.

The dial-up server 112 can be embodied by a computer which has an operating system such as Windows NT®, Linux® or Unix® and appropriate hardware adapters to receive incoming dial-up calls. The dial-up server 112 interfaces with the servers 106, 108, 110, as well as client 102, through the Internet/Intranet 104.

Figure 2 illustrates a logical software block diagram for the present invention. It includes four modules including a Location Manager 204, a Synchronization Manager 206, a Connection Manager 208, and a Locator Module 232.

The Location Manager 204 provides functionality for administering and managing location-specific information that is stored by the present invention in a Registry 210. The Registry is a portion of the Windows® data structure which Windows® operating systems maintains of all of their programs for storing a platform-specific information.

The Location Manager is a software facility for administering and executing connectivity and information management tasks, and includes a unit for selectively adding, deleting and editing location objects, and a

unit for initiating request for a connection, disconnection and information synchronization.

The Location Manager allows a user to define and manage location objects, and to establish a network connection and perform information management tasks that a user is interested in. The Location Manager allows the user to reconfigure different location profiles for different sites, so that if the user wishes to travel, for example, to Tampa, Florida, the user can select the Tampa site from the location profile, and the Location Manager will automatically reconfigure all of the of the required parameters for that site, so that the user can immediately connect to the network.

The location object captures user-defined location-specific information such as the geographic location of a user, network and dial-up information, network resources such as printers, mapped drives, and all information management tasks such as file synchronization, web page caching, and mail synchronization, that must be performed for a specific location.

Thus, the Location Manager provides a user with a centralized facility to administer and manage all computer system configuration parameters that must be updated whenever the user and his computer change physical location. In addition, it also provides the user with a single point of control for managing all information tasks such as synchronizing file data, sending and receiving electronic mail, and caching web pages for offline browsing.

The Synchronization Manager 206 module provides the functionality to send and receive electronic mail 222, synchronize file data 220 and retrieve and hoard (e.g., store) web pages 226 for off-line browsing. The Mail 222 sub-module provides functionality to retrieve mail using the Lotus Notes® 224, Microsoft Exchange®, Internet Messaging Access Protocol (IMAP®) 230 and POP3® 228 protocols.

The Connection Manager 208 provides connectivity functionality to establish a network connection using a modem 212, a token-ring card 214 and an Ethernet card 216. It also provides a graphical user interface (GUI) to enable a user to initiate synchronization.

The Locator Module 232 provides the functionality of determining the physical location of the computer using electronic means. The exemplary embodiment shown in Figure 2 supports several electronic units/means (e.g., a GPS sub-module 234 and a Caller ID sub-module 236). Other electronic units/means which could be employed include other satellite positioning systems, cellular positioning unit 237 (e.g., proximity to cells in a cellular network), and other forms of a radio triangulation unit 238.

Figure 3 shows a flow control diagram of the Locator Module 232. The Locator module 232 exports a single API 300 called GetCurrentLocation() to the Location Manager 204.

When the Location Manager 204 is started by a user, it issues the GetCurrentLocation() call to the Locator Module 232 and the method of Figure 3 is performed.

First, in step 302, the Locator Module 232 determines whether a communication (e.g., telephone) line is connected to the modem of the client computer 102.

If it is determined that a line is connected, then the Locator module 232 dials a predetermined toll free number to the dial-up server 112 (step 304). Upon receiving the call, the dial-up server's modem answers the call and extracts and saves the telephone number of the caller using the Caller ID feature of the telephone service provider (step 316).

Then, in step 306, the client computer 102 sends a request message to the dial-up server 306 requesting the telephone number from which the call was made. In step 318, the dial-up server 112 sends a reply to the client 102 with the telephone number of the caller.

In step 308, the Locator module 232 extracts the telephone number from the reply message and searches the Registry 210 (e.g., see Figure 2) for a location configuration for the specific telephone number in step 312.

If, in step 312, it is determined that a location configuration is found, then the flow proceeds to step 314. In step 314, the name of that location is returned to the Location Manager 204.

If, in step 312, a location is not found, then a "Not Found" result is returned to the Location Manager 204 (step 320).

Further, it is noted that, in step 302, if it is determined that a communication (e.g., telephone) line is not connected to the modem, then the Locator Module 232 determines whether a GPS receiver is attached to the computer 102 (step 322).

5.

If a GPS receiver (or another electronic unit as mentioned above) is attached to the computer 102, then in step 324 the Locator Module 232 retrieves the local GPS coordinates from the receiver and uses these coordinates to determine the City, State and Country where the computer is

10   located.

In step 310, using the above-mentioned information (e.g., city, state, country, or the like), the Locator Module 232 searches the Registry 210 to determine the location configuration for that physical location.

15

The process continues to step 312 to determine if a location configuration is found. If a configuration is found in step 312, then the name of that location is returned to the Location Manager 314. If a location is not found, then the "Not Found" result is returned to the

20   Location Manager (step 320) as described above.

If the Location Manager is returned a valid location name by the Locator module 232, the Location Manager 204 uses the information to automatically configure the computer system 102 based on the configuration

25   information stored in the location.

Figure 4 illustrates a typical hardware configuration (e.g., for the client's portable device) of an information handling/computer system 400 in accordance with the invention. The computer system 400 preferably has at

30   least one processor or central processing unit (CPU) 411.

The CPUs 411 are interconnected via a system bus 412 to a random access memory (RAM) 414, read-only memory (ROM) 416, input/output (I/O) adapter 418 (for connecting peripheral devices such as disk units 421 and

35   tape drives 440 to the bus 412), user interface adapter 422 (for connecting a keyboard 424, mouse 426, speaker 428, microphone 432, and/or other user interface devices to the bus 412), a communication adapter 434 for connecting an information handling system to a data processing network, the Internet, an Intranet, etc., and a display adapter 436 for connecting the

40   bus 412 to a display device 438 and/or printer 439.

In addition to the hardware/software environment described above, a different aspect of the invention includes a computer-implemented method for performing the above method. As an example, this method may be implemented in the particular environment discussed above.

Such a method may be implemented, for example, by operating a computer, as embodied by a digital data processing apparatus, to execute a sequence of machine-readable instructions. These instructions may reside in various types of signal-bearing media.

Thus, this aspect of the present invention is directed to a programmed product, including signal-bearing media tangibly embodying a program of machine-readable instructions executable by a digital data processor to perform the above method.

Thus, as shown in Figure 5, in addition to the hardware and process environment described above, a different aspect of the invention includes a computer-implemented method of providing automatic configuration of computer system based on its physical location using electronic means (e.g., caller ID and/or GPS). As an example, this method may be implemented in the particular hardware environment discussed above.

Such a method may be implemented, for example, by operating the CPU 411 (Figure 4), to execute a sequence of machine-readable instructions. These instructions may reside in various types of signal-bearing media.

The signal-bearing media may include, for example, a RAM contained within the CPU 411, as represented by the fast-access storage for example. Alternatively, the instructions may be contained in another signal-bearing media, such as a magnetic data storage diskette 500 (Figure 5), directly or indirectly accessible by the CPU 411.

Whether contained in the diskette 500, the computer/CPU 411, or elsewhere, the instructions may be stored on a variety of machine-readable data storage media, such as DASD storage (e.g., a conventional "hard drive" or a RAID array), magnetic tape, electronic read-only memory (e.g., ROM, EPROM, or EEPROM), an optical storage device (e.g. CD-ROM, WORM, DVD, digital optical tape, etc.), paper "punch" cards, or other suitable signal-bearing media including transmission media such as digital and analogue and communication links and wireless. In an illustrative

embodiment of the invention, the machine-readable instructions may comprise software object code, compiled from a language such as "C", etc.

With the unique and unobvious features of the present invention, the problem of reconfiguration of a computer in a new location is alleviated by automatically configuring the computer system based on its physical location using an electronic unit (e.g., a caller ID and/or a GPS, cellular positioning, radio triangulation, other satellite positioning systems, etc.)

While the exemplary implementation above has been described with regard to a portable computing device (e.g., a laptop computer), other devices such as personal data assistants (PDAs), Palm Pilots, portable telephones, products such as MobilonPro produced by Sharp Corporation, etc. will find equal benefit with the features of the present invention.

CLAIMS

1.   A system for automatically configuring a portable device for electronic communication over a network, comprising:

5

locating means for electronically inferring the physical location of the portable device;

retrieval means for retrieving location configuration information
10   corresponding to the inferred physical location; and

configuration means for configuring the portable device based on the location configuration information.

15   2.   The system of Claim 1, wherein the locating means includes a telephone caller-identification system.

3.   The system of Claim 1 or Claim 2, wherein the locating means comprises a Global Positioning Satellite (GPS) receiver.

20

4.   The system according to any preceding claim, further comprising:

means for sending and receiving electronic mail from a mail server;

25   means for retrieving web pages from a web server; and

means for receiving data files from a file server, said mail server, said web server, and said file server being coupled to said portable device through at least one of the Internet and an Intranet;

30

said locating means including means for determining a communication line number of the physical location from where a user is calling from, for interfacing with the mail server, said web server, and said file server.

35   5.   The system according to any preceding claim, wherein said configuration means comprises:

a location manager for administering and managing location-specific information that is stored in a registry;

40

said system further comprising:

a synchronization manager for sending and receiving electronic mail, and synchronizing file data and retrieving and storing web pages for off-line browsing; and

5

a connection manager for providing a connectivity functionality to establish a network connection, and for providing a graphical user interface (GUI) to enable the user to initiate synchronization.

10   6.   A method for automatically configuring a user's portable device for electronic communication over a network, comprising:

electronically inferring the physical location of the portable device;

15

retrieving location configuration information corresponding to the physical location; and

configuring the portable device based on the location configuration
20   information.

7.   The method according to claim 6, comprising the steps of:

determining whether a communication line is connected to the portable
25   device;

if it is determined that a line is connected, then dialling a predetermined number to a dial-up server;

30   answering, by the dial-up server, the call and extracting and saving said predetermined number of the caller using a caller identification system;

sending, by said portable device, a request message to the dial-up
35   server requesting the predetermined number from which the call was made; and

sending, by the dial-up server, a reply to the portable device with the predetermined number of the caller.

40

8.   The method according to claim 7, comprising the further step of:

extracting the predetermined number from the reply message.

5   9.   The method according to claim 8 comprising the further step of:

searching a registry for a location configuration for the predetermined number.

10   10.   The method according to claim 9 comprising the further step of:

if it is determined that a location configuration is found, returning the name of the location configuration to a location manager.

15   11.   The method according to claim 9 or claim 10 comprising the further step of:

if a location configuration is not found, then returning a "Not Found" result to a location manager.

20

12.   The method according to claim 6 comprising the step of:-

if it is determined that a communication line is not connected to the portable device, then determining whether a Global Positioning Satellite
25   (GPS) receiver is attached to the portable device.

13.   The method according to claim 12 comprising the further step of:

if a GPS receiver is attached to the portable device, retrieving the
30   local GPS coordinates from the receiver and using said coordinates to determine a geographical location information as to where the portable device is located.

14.   The method according to claim 13 comprising the further step of:
35

using said geographical location information regarding a location of the portable device to search a registry to determine the location configuration for that location.

40   15.   The method according to claim 14 comprising the further step of:

if a configuration is found, then returning the name of the location configuration to a location manager.

16. The method according to claim 14 comprising the further step of:

if a location configuration is not found, then returning a "Not Found" result to a location manager.

17. A computer program executable by a digital processing apparatus to perform a method for computer- implemented automatic configuration of a user's portable device, the method comprising:

electronically inferring the physical location of the portable device;

retrieving location configuration information corresponding to the physical location; and

configuring the portable device based on the location configuration information.

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): H4K: KF42,KFMA; H4L: LDPB

Int Cl (Ed.7): H04M: 3/42; H04Q: 3/00,7/22,7/38

Other: Online: EPODOC,PAJ,WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2357404 A (ACTIVERF LTD) See Fig.1, page 9 line 21 - page 10 line 29	1,6,17
A	GB 2271912 A (MITEL) See Fig.1, abstract, page 2 lines 16-28, page 6 line 30 - page 8 line 12	1,6,17
A	GB 2198011 A (AT&T) See Fig.1, abstract, page 4 line 26 - page 5 line 23, claim 1	1,6,17
X	WO 99/33293 A1 (GLOBAL MOBILITY) See Fig.1, abstract, page 3 line 26 - page 4 line 2, page 9 lines 9-23, claim 62	1,6,17